



MEMORANDUM

TO: Pat Goddard, Director of Facilities, Town of Lexington
Paul Ash, Superintendent, Lexington Public Schools, Estabrook Advisory Committee

FROM: David L. MacIntosh, Sc.D.

DATE: November 10, 2010

RE: Air Samples Collected on November 4, 2010, Estabrook Elementary School

This memorandum provides results of the eighth and most recent round of air sampling at Estabrook Elementary School. The objective of the testing was to measure levels of polychlorinated biphenyls (PCBs) in indoor air of classrooms that have been mitigated according to the interim measures planned at this time for the entire school.

The interim measures were completed in Room 4 and Room 6 as of Wednesday, November 3, 2010. Air samples were collected in those rooms from approximately 9:30 a.m. – 4:00 p.m. the following day. Details of the interim measures and other aspects of the current indoor environmental quality (IEQ) management plan are available in the Project Update memorandum dated October 28, 2010, and the materials distributed to the Superintendent's Advisory Committee on November 4, 2010. In brief, a mini-wall; was constructed in each room to encapsulate the lower panels of the curtain wall and thereby separate them from indoor air of the classroom. The mini-wall constructed in Room 6 is depicted in Figure 1. In addition, I-beam chases were enclosed and specific areas related to the curtain wall were sealed with new caulk or foam insulation. Areas sealed included edges of the mini-wall, metal-to-metal joints of aluminum framing, and original caulking at the intersection of horizontal and vertical aluminum frames.



Figure 1 Photograph of Mini-wall Installed in Room 6

Operating conditions during the testing of Room 4 and Room 6 were standard for winter conditions, except that convective heaters in Room 6 were not in use in accordance with the current IEQ management plan. The outdoor air ventilation rate was approximately 300 cubic feet per minute (cfm) in Room 4 and 470 cfm in Room 6. The thermostat in each room was set to 70 degrees Fahrenheit.

As shown in Table 1, the PCB concentrations in indoor air of Room 4 and Room 6 were 105 nanograms per cubic meter (ng m^{-3}) and 131 ng m^{-3} , respectively. These PCB concentrations are within the most conservative public health levels for all ages suggested by the site-specific assessment (230 ng m^{-3}). In addition, these concentrations are well below the public health levels suggested by the U.S. Environmental Protection Agency (EPA) for children older than 6 years (300 ng m^{-3}) and adults (450 ng m^{-3}) and very close to EPA's suggested levels for children less than 6 years old (100 ng m^{-3}).

Table 1 Air Sample Results for Polychlorinated Biphenyls as Total Homologs, Estabrook Elementary School, 117 Grove Street, Lexington, Massachusetts, July 22, 2010 – November 4, 2010*

Sample Location	PCBs in Air as Total Homologs (ng/m ³)							
	Round 1 ^a	Round 2 ^b	Round 3 ^c	Round 4 ^d	Round 5 ^e	Round 6 ^f	Round 7 ^g	Round 8 ^h
Room 1	299	426	118 [†]	63 [†]	76 [†]	153 [†]	145	–
Room 2	–	775	455	189	166	253 [‡]	53	–
Room 3	–	–	–	–	–	364 [‡]	111	–
Room 4	–	–	–	–	–	344 [‡]	126	105
Room 5	459	736	320	196	149	209 [‡]	67 - 90	–
Room 6	1,800	764	483	171	213	383	182	118 - 144
Room 7A	–	–	5.19	–	–	–	–	–
Room 13	319	340	184	155 [†]	–	–	–	–
Room 21A	–	–	410	193	–	–	–	–
Room 24	680	601	226	173 [†]	–	–	–	–
Room 26	–	–	–	79	–	–	–	–
Room 31A	562	575	444	–	–	282	–	–
Room 39B	–	419	–	–	–	–	–	–
Room 39C	342	495	245	100	–	–	–	–
Library	–	469	196	–	–	–	–	–
Art Room	–	–	194	–	–	–	–	–
Teacher Work Room	–	–	138	–	–	–	–	–
Basement	–	–	227	–	–	–	–	–
Ceiling plenum (39C)	–	–	562	–	–	–	–	–
Psychologist Office	–	–	–	–	–	253	–	–
Outdoors	<3.79	<5.00	<4.20	<4.46	<4.32	<4.44	<5.54	<4.58

PCB polychlorinated biphenyl
ng/m³ nanograms per cubic meter
– air sample not collected at that location

^a Round 1 samples collected July 22, 2010, during summer conditions.

^b Round 2 samples collected on August 25, 26 or 27, 2010, following removal of caulk around exterior window frame.

^c Round 3 samples collected on September 6, 2010, following initial optimization of outdoor air delivery and central exhaust, unless otherwise noted.

^d Round 4 samples collected on September 19, 2010, with optimization of outdoor air delivery and central exhaust, and indoor caulk encapsulation, unless otherwise noted.

^e Round 5 samples collected on September 27, 2010, with optimization of outdoor air delivery and central exhaust, partial indoor caulk encapsulation, and isolation of ceiling tiles.

^f Round 6 samples collected on September 28 or 29, 2010, with ventilation as noted, central exhaust, full indoor caulk encapsulation, and isolation of ceiling tiles.

^g Round 7 samples collected on October 18 or 19, 2010 with room conditions as described in October 12, 2010, memo.

^h Round 8 samples collected on November 4, 2010, with winter ventilation, mini walls, and encapsulation.

[†] Samples collected with reduced outdoor air delivery.

[‡] Sample collected with supplemental air outdoor air (1,200 cfm).

* PCB concentration analysis performed by Alpha Analytical Inc., using U.S. Environmental Protection Agency (EPA) Method 10A (GC/MS-SIM).

A graphical summary of the PCB concentration measured in indoor air of the school between July 22 and November 4, 2010, is provided in Figure 2. Indoor air PCB levels measured during Round 8 were approximately 5-fold lower than in Round 1. Similarly, a 3-fold decrease in average concentrations has been achieved since winter ventilation conditions began in late September. These observations demonstrate the effectiveness of the mitigation methods employed in the school.

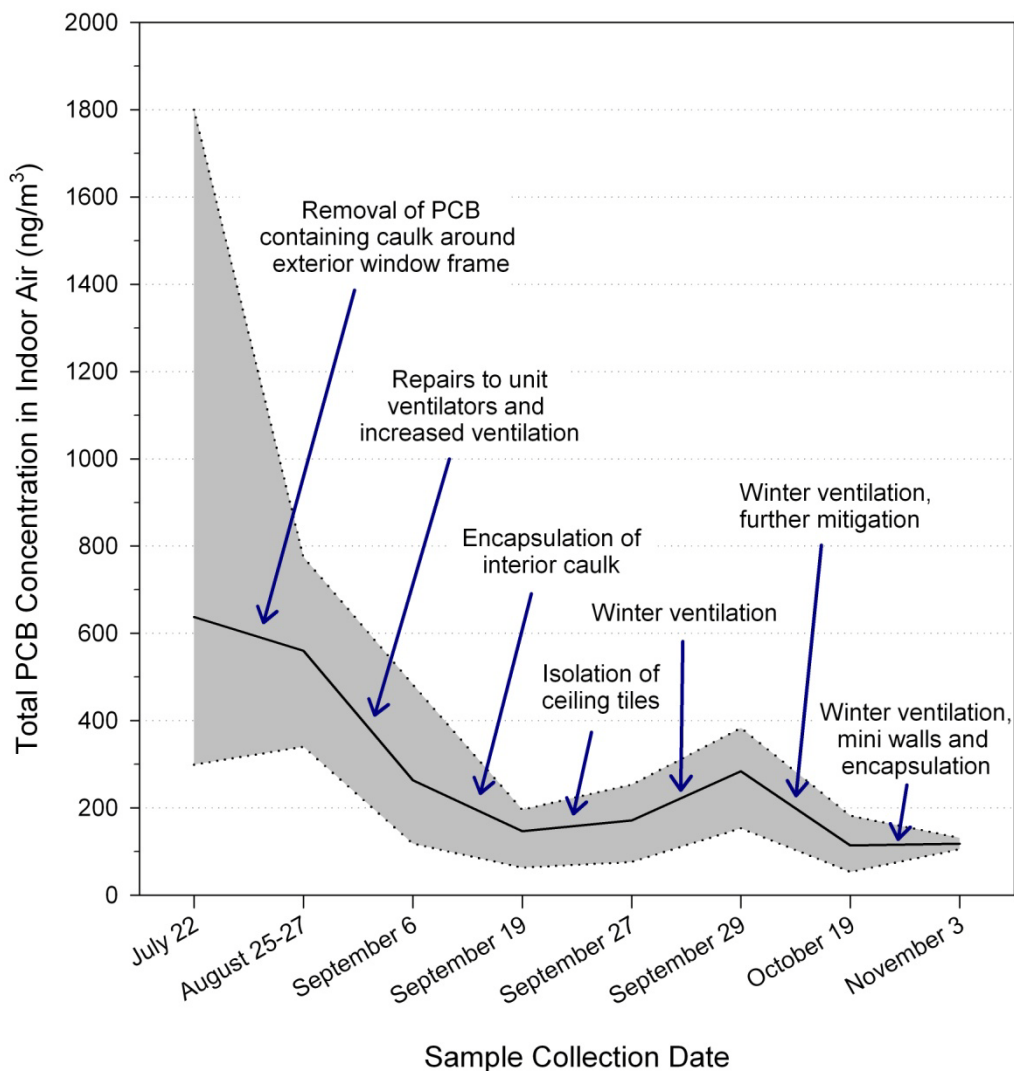


Figure 2 Average (line) and Range (shaded area) of Total PCB Concentration in Indoor Air Over Time